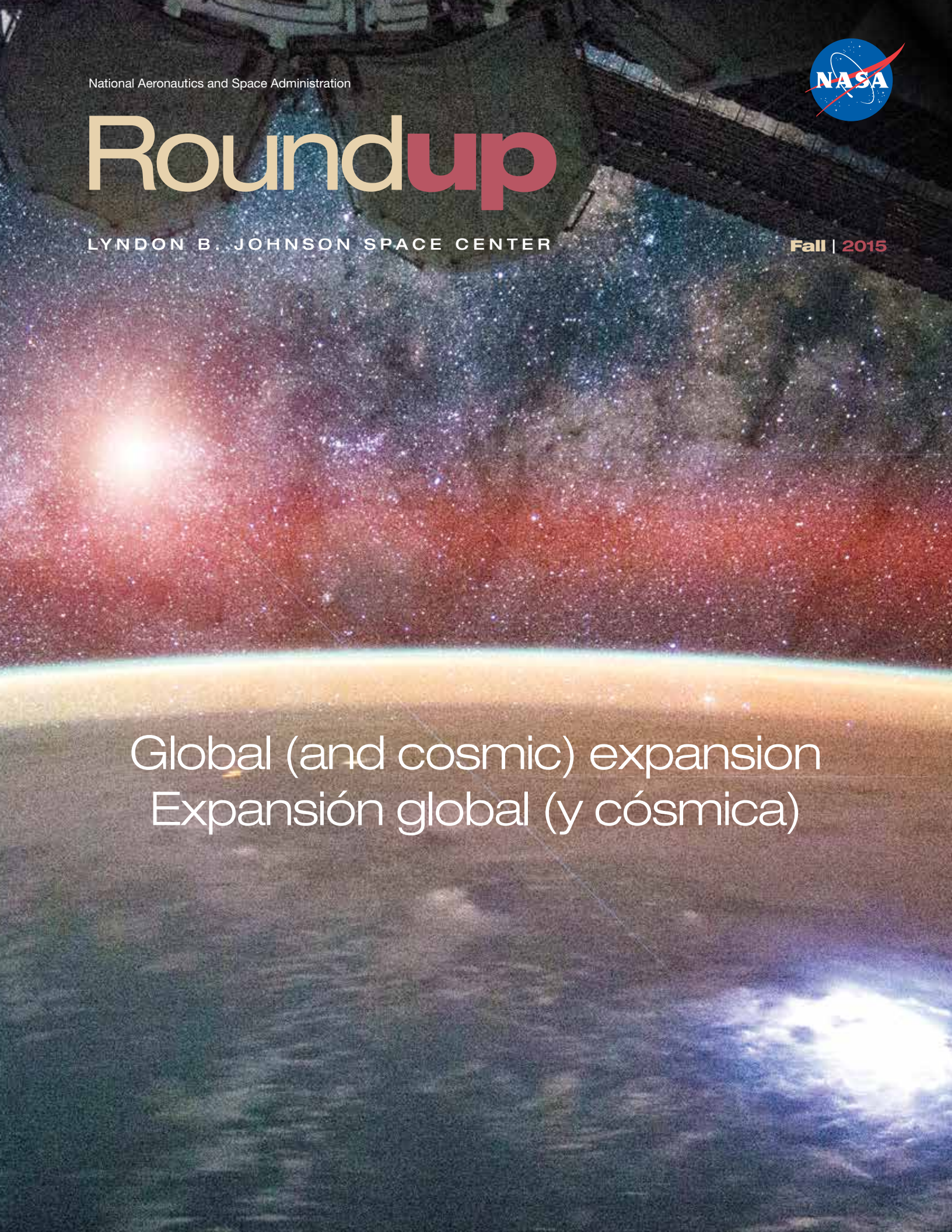


National Aeronautics and Space Administration

# Roundup

LYNDON B. JOHNSON SPACE CENTER

Fall | 2015

## Global (and cosmic) expansion
## Expansión global (y cósmica)

# In this edition…



**On the cover:**

**Early September, as the International Space Station flew above the Pacific Ocean, thunderstorms abounded below. NASA astronaut Kjell Lindgren captured a lightning strike on Earth that reflected off the station's solar panels.**

# Guest Column

NASA/PHOTO

**Mark Geyer**
JSC Deputy Director

**I'M WRITING THIS COLUMN** having only been on the job for about two weeks, so I'm still learning the duties of a deputy director. While I have been to the ninth floor of Building 1 many times, it is interesting how I have begun to see the center differently as I take on this new role.

I was the Orion Program manager for nearly eight years. During that time, I experienced many transitions in NASA leadership and policy. Some of these were difficult for the team to weather, but they met the challenge. I believe these experiences taught me how to anticipate, adapt and lead a team through change. It is my hope that these experiences will provide me the insight to help Ellen lead the center into NASA's next chapters of human spaceflight.

I know that the other programs and directorates at JSC are faced with their own specific, dynamic environments. In the coming weeks, I'll be taking some time to get an understanding of the strategies and challenges involving all of the organizations here at JSC. I look forward to learning more from each of you as I take on this new position. I hope you will share your thoughts and visions for what JSC could be as we work together to take our center and human space exploration to even greater achievements.

While each of us may have different experiences, all of us are pulling in the same direction: to further U.S. leadership in human spaceflight.

See you in the coming weeks,

Mark Geyer

*Get to know our new deputy director. View his bio here: http://www.nasa.gov/centers/johnson/about/people/orgs/bios/deputydirector.html*

NASA/PHOTO

**Photo of the quarter:**

**This artist's concept illustrates a Martian dust storm, which might also crackle with electricity. Sci-fi author Andy Weir's "The Martian" begins with a massive dust storm that strands fictional astronaut Mark Watney on Mars. In the scene, powerful wind rips an antenna out of a piece of equipment and destroys parts of the astronauts' camp. But are these types of storms on Mars really fact, fiction—or something in between? Find out: http://go.usa.gov/3eSaP**

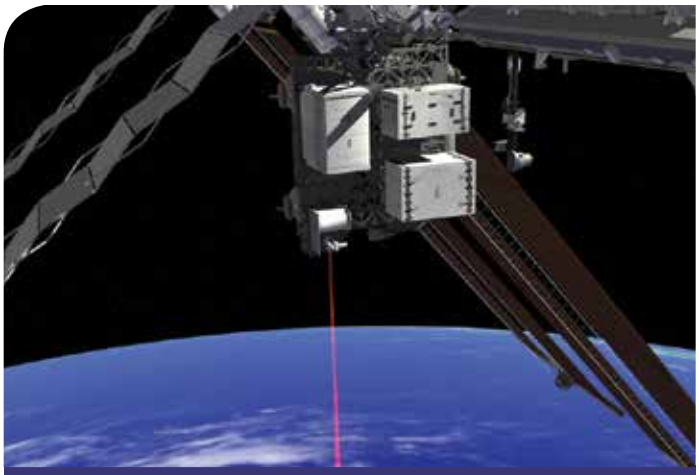
By Andrea Dunn



# Station's OPALS investigation is laser-focused on deep space communication

**TODAY'S TECHNOLOGY HAS** all but eliminated time delays in telecommunication on Earth, but when they do occur they can be frustrating, especially when trying to communicate complex or time-sensitive information. The same type of delay could happen when communicating with spacecraft and crew members in deep space on the journey to Mars. For example, communication over radio waves could have roundtrip delays of up to 31 minutes at Mars.

Researchers for the Comm Delay Assessment investigation set out to determine whether communication delays, like those astronauts could experience on a long-duration mission to an asteroid or Mars, will result in impacts to individual and crew performance and well-being. They studied three crew members aboard the International Space Station and their mission control support teams, completing 10 tasks during a recent increment: six tasks with no communication delay and four tasks with a 50-second delay. The tasks were based on novelty (how new the task was to each crew member) and criticality (how complex the task was for the crew member).



NASA/PHOTO

**This artist's concept shows how the OPALS laser beams data to Earth from the International Space Station.**

By analyzing pre- and post-flight interviews, video recordings and questionnaires, investigators determined that high-quality communication (no delay) resulted in high performance and mood. Mood then decreased during tasks that included a delay.

"Crew members reported getting frustrated when they needed communication quickly," said Principal Investigator Larry Palinkas, Ph.D. "Tasks took longer, and there was frustration when the crew members or mission control had to ask additional questions, because they were not getting the information they needed in a timely fashion, or there was miscommunication that needed clarification."

Some frustration was attributed to other distractions, including ambient noise in various locations in the space station, having "space brain," which makes things harder to remember and comprehend, and other crew members asking questions when another was trying to communicate with the ground.

Crew members expressed that being understood by others was the most important aspect of communication quality. Being understood by others was also significantly associated with perceptions of autonomy—whether the crew members had the opportunity to exercise independence. The autonomy boosted performance and moods during the tasks.

"We learned a lot from interviews with the crew members," added Palinkas. "They provided us with what personal aspects they felt were associated with the delay and provided suggestions for improving communication with the ground, especially related to long-duration missions."

Some suggestions included asking longer and more detailed questions or conferring among themselves about what they need to ask ground control and how they should ask it, anticipating follow-up questions in advance. They also suggested incorporating communication delays into their training.

Other suggestions related to technology included using devices that could playback communications, supplementing communication with video so ground control could have better context for questions and developing communications technology that could reduce the delays.

One such technology was studied during the Optical Payload for Lasercomm Science (OPALS) investigation, which proved that using laser communications rather than radio waves allows you to transmit more data at faster speeds. Both radio waves and lasers travel at the speed of light, and could still take 31 minutes to get to Mars, but the laser improves the quantity of data transmitted. While the delay may be the same, the amount of information received would greatly increase, making it worth the wait.

In June 2014, NASA successfully beamed high-definition video via laser from space to ground at 50 megabits per second. (For reference, video streaming at 20 megabits per second is similar to watching live TV.) The 175-megabit video was the first of its kind for OPALS and the first step in improving the way we receive data from orbit and beyond. Focused laser energy offers the promise to achieve data rates 10 to 100 times higher than present-day space communications—which currently is similar to communicating via dial-up Internet service. OPALS' success is an important link in improving communication rates with spacecraft beyond low-Earth orbit.

"Optical comm could improve upon the delay," said OPALS Principal Investigator Abhijit Biswas, Ph.D. "It can certainly help with the capacity problem by bursting down huge volumes of data that could include voice and streaming video."

"The limited bandwidth of today's communication technology leads to the same frustration one experiences while waiting for a movie to buffer," said Bogdan Oaida, OPALS project systems engineer. "With optical comm, you wouldn't have that limitation."

OPALS continues to be a laser sensation. In March, OPALS demonstrated that laser signals from the space station can be focused into fibers one-quarter the width of a human hair, which is the standard in the telecommunications industry. Later this year, researchers hope to use OPALS to help measure platform vibration on the space station, which could provide data that will assist with space station guidance and navigation. The research team will also work with several international partners to attempt laser transmissions to ground stations in their respective countries. Technology such as OPALS, along with additional methods for improving communication between Earth and deep space, will provide crew members with the ability to "phone home" on their journeys to Mars and beyond while maintaining performance and morale.

# **Veteran explorers** slated for future commercial crew flights …

**NASA HAS SELECTED FOUR ASTRONAUTS** to train and prepare for commercial spaceflights that will return American launches to U.S. soil and further open up low-Earth orbit transportation to the private sector. The selections are the latest major milestone in the Obama Administration's plan to partner with U.S. industry to transport astronauts to space, create good-paying American jobs and end the nation's sole reliance on Russia for space travel.

NASA named experienced astronauts and test pilots Robert Behnken, Eric Boe, Douglas Hurley and Sunita Williams to work closely with The Boeing Company and SpaceX to develop their crew transportation systems and provide crew transportation services to and from the International Space Station.

NASA /PHOTO

**From left, veteran astronauts Doug Hurley, Eric Boe, Robert Behnken and Sunita Williams were named for the commercial spaceflights that will open up low-Earth orbit transportation to the private sector.**

## … and new explorers are now part of NASA's astronaut corps

**AS OF JULY 7, EIGHT NEW ASTRONAUTS** are ready to help advance scientific research aboard the International Space Station and pave the way for America's new space launch capabilities and journey to Mars. The four women and four men moving from candidates to the corps were part of the 2013 astronaut class, chosen from 6,300 applications—the second largest number of applications NASA has ever received.

"These individuals have worked incredibly hard to attain this milestone," said Chris Cassidy, chief of the Astronaut Office at Johnson Space Center. "For many, it is the culmination of a lifetime of dedication and perseverance to reach this goal. We are proud to have them join the NASA astronaut corps."

**Who are these newly minted astronauts? Introducing:**

- U.S. Navy Lt. Cmdr. Josh Cassada
- U.S. Navy Lt. Cmdr. Victor Glover
- U.S. Air Force Lt. Col. Tyler "Nick" Hague
- Christina Hammock
- U.S. Marine Corps Maj. Nicole Mann
- U.S. Army Maj. Anne McClain
- Jessica Meir
- U.S. Army Maj. Andrew Morgan

NASA /PHOTO

**The 2013 astronaut class members pose at Johnson Space Center on July 8 after receiving their astronaut pins, symbolizing the completion of their training.**

NASA/BILL STAFFORD

**As astronaut candidates, Nicole Mann and Jessica Meir train for spacewalking in the Neutral Buoyancy Lab.**

# All aboard the education station!

By Cat Pate

**TEACHING IS A TOUGH GIG.** Determining a topic, finding the data, analyzing it and transforming the raw data into useful information that's interesting to students can be a long process. The Johnson Space Center Office of Education is taking NASA astronaut Scott Kelly's one-year mission—and the investigations surrounding the human health countermeasures that will be developed for future long-duration flights—and breaking it down into fascinating nuggets of information. This material will be shared with students and formal and informal educators using the new STEM on Station website. The recently launched website makes

NASA /PHOTO

**Students wait in line to ask a question of astronauts living aboard the space station during a downlink at the U.S. Department of Education.**

it easier for educators to find information about the International Space Station (ISS), the one-year mission and future expeditions.

"The STEM on Station website provides an excellent resource for educators, students and the general public on the ISS one-year mission," said Camille Alleyne, Ed.D., associate ISS program scientist for Communications and Education. "Sponsored by NASA's Human Research Program, the one-year mission is a steppingstone to future missions to Mars and beyond. It is therefore imperative that we engage and inspire the next generation of scientists, engineers, technologists and explorers, and the STEM on Station website plays a big role in facilitating that engagement."

Educators and parents can easily access detailed science, technology, engineering and math (STEM) lesson plans for K-12 students on the new website. Each lesson plan is carefully crafted to lead students on a journey to investigate a variety of different station-related activities, including how astronauts communicate, how oxygen is produced from wastewater and how to estimate radiation dosages for astronauts on the orbiting laboratory. Videos are also available to enhance the students' experience as they explore each STEM discipline, and each video highlights one of the seven different research themes from the one-year mission.

So, what is NASA doing with all the research being conducted on this yearlong mission? NASA is working off the Earth, for the Earth, advancing science and research aboard the space station and unlocking potential benefits for humanity here on Earth. Due to microgravity, fluid shifts away from the legs and upward toward the head, which causes increased intracranial pressure and decreased visual capacity in astronauts. The one-year crew is testing noninvasive technology to research the fluid shift using devices that assess characteristics of sound and pressure waves reflecting off the inner ear, and these devices may become available for patients on Earth suffering from elevated intracranial pressure. Results from the fluid shift investigation will also improve scientists' understanding of how blood pressure in the brain affects eye shape and vision, which could also benefit people confined to long-term bed rest.

Sixteen countries participated in building the engineering marvel that is space station, and it takes an international village to keep it operating 24/7. Educators can discover information about each international partner space agency and how we all work together.

Other educational activities will be available throughout the duration of the #YearInSpace. TIME For Kids will release a station-focused issue in October, and Charlotte Kelly, daughter of one-year mission NASA astronaut Scott Kelly, is a guest kid reporter for its space-themed mini-site.

In September, the JSC Office of Education also hosted the first #spacED event, where education reporters toured NASA and heard subject-matter experts speak about educator resources and tips on how to use them in the classroom.

Learning opportunities are available all around you. The JSC Office of Education is constantly developing new avenues to ensure that the work completed off the Earth and for the Earth is also available in the classroom and at home.

Visit the STEM on Station website:
http://www.nasa.gov/education/STEMstation

NASA /PHOTO

**Middle-school student scientists hard at work on NASA activities.**

# White House lands at the house of human spaceflig for Hispanic education

**OFF THE EARTH, FOR THE EARTH.** It's a great International Space Station (ISS) message, but one that has historically been limited to English-speaking Earthlings. However, by embracing a community partnership and a Commitment to Action for a White House Initiative on Educational Excellence for Hispanics, the excitement surrounding human space exploration will finally have a melodic lilt as some Johnson Space Center products and outreach efforts get a makeover *en Español*.

Initially, Johnson Space Center's involvement began with the ISS Program Science Office looking into ways to reach a wider, more diverse audience. One avenue identified was Space to Ground, a weekly two-minute video glimpse into what is happening aboard the orbiting laboratory.

"As the media relations coordinator for the ISS Program Science Office, I thought about all of our media contacts who could help disseminate our ISS key messages to the fastest-growing demographic that we have, and going to Univision became obvious because they reach a wide audience, both locally and internationally—and particularly in the Hispanic community," said Lesa Spivey with the Information Technology and Multimedia Services (ITAMS) contract. "I decided to approach them about working with us and possibly distributing Space to Ground. Follow-up discussions with Univision led to the idea of translating the show into Spanish."

With the support of Camille Alleyne, Ed.D., ISS associate program scientist, Spivey enlisted the help of ISS Imagery Manager Carlos Fontanot and other members of JSC's Hispanic Employee Resource Group (HERG) in brainstorming ideas to grow Space to Ground. They not only were eager to be onboard, but also already had plans in work of their own to expand JSC's presence in Hispanic communities.

"To me, the White House initiative was like a gift from heaven—it came to us at the perfect time," said HERG Chair Juan Carlos Lopez, also an aerospace engineer in Structural Loads and Dynamics. "When the opportunity was brought to us through one of our members, I thought it was a great way to engage our group in the efforts that NASA and JSC were already working on. As we started developing this Commitment to Action, we put together a small tiger team of different people around the center who were passionate and eager to share their innovative ideas."

The HERG's Commitment to Action, submitted to the White House, encompasses a three-pronged approach:

- Introduce K-12 students and their parents at Bring Our Children to Work Day, with a focus on sixth- to seventh-graders, to science, technology, engineering and math (STEM) fields
- Make available a bingo-style game and learning resource, called Space Loteria, that brings STEM concepts into Hispanic homes and classrooms
- Translate and tailor pilot episodes of Space to Ground—or as it will be known to the Latino community worldwide, "Espacio a Tierra"—during Hispanic Heritage Month (Sept. 15 to Oct. 15)


NASA/PHOTO

**From left: Mike Ruiz, former chair of the HERG; Juan Carlos Lopez, current HERG chair; Alejandra Ceja, executive director for the White House Initiative on Educational Excellence for Hispanics (WHIEEH); Jaqueline Cortez-Wang, senior advisor for the WHIEEH; Mario Arreola, executive director for educational outreach for the Mexican Space Agency; Alma Stephanie Tapia, current HERG chair-elect; Lilibeth Mata, current HERG committee lead; and Lesa Spivey, media relations coordinator for the ISS Program Science Office.**

# ht to praise our Commitment to Action

By Catherine Ragin Williams

NASA/PHOTO

**In August, representatives from Johnson Space Center and White House Initiative on Educational Excellence for Hispanics meet to collaborate and discuss ideas. JSC was recognized for its efforts in broadening educational opportunities for historically underserved populations.**

"We pride ourselves as an organization in empowering our members to be able to bring their ideas forward and be agents of change and innovation," said HERG Chair Elect Alma Stephanie Tapia, also a Materials and Processes engineer. "We consider our group 'HERG 2.0' in contemplating how we can push the boundaries on growing and providing real value to the organization and to NASA."

This inclusive approach to sharing NASA's message will open the realm of human spaceflight to more of the world's inhabitants, and that can only be beneficial.

"Besides Univision and the White House, we were also able to bring onboard the Mexican Space Agency, who will promote the Space to Ground en Español videos on their social media platforms and their websites," Lopez said. "I see Space to Ground as a way to not only reach out to Hispanic communities in the U.S., but also to Spanish-speaking countries around the world and let them know that NASA is here—and we are willing to collaborate. With NASA's Journey to Mars vision, we need to build this global community that will take us to Mars and destinations beyond."

The White House visited JSC on Aug. 5, first to collaborate—and later that evening to formally unveil the initiative and recognize the center as an example for other agencies and organizations to follow in broadening education initiatives for Hispanics across the country.

"At the end of the meeting we had a couple of weeks ago with the White House, representatives came to me to express their admiration for JSC's efforts and initiatives in support of Hispanics," Lopez said.

It's not hard to see why.

"I think that helps highlight the fact that our senior leadership is really behind Employee Resource Groups," Tapia said. "They are really helping champion JSC 2.0 and empowering employees—at any level of their careers—to be able to make significant change," Tapia said.

With the success of Bring Our Children to Work Day motivating Hispanic youth and the Space Loteria game bringing space education into Latino homes, the pilot "Espacio a Tierra" is poised to showcase NASA and the space station on screens usually not warmed by the broadcast. If it proves popular, it could be the impetus for bringing more people into NASA's fold.

"Young people are the future of NASA and of space travel, so getting them involved early is so important," Spivey said. "Having two strong partners such as Univision and the White House just helps reinforce the message that we're on to something meaningful and impactful."

To watch Space to Ground, or "Espacio a Tierra," go to: https://www.youtube.com/user/ReelNASA

*Space to Ground is produced weekly by JSC's Office of Communications and Public Affairs and the ITAMS Media Production Services team.*

**DID YOU KNOW?** The HERG's nomination to the White House for a Bright Spots in Hispanic Education award was also recently accepted for recognition through the initiative's Anniversary Year of Action. This specifically recognizes the past efforts of JSC team members in bringing STEM education to generally underserved minority students. Before the HERG, there was the Hispanic Advisory Committee. This group was doing volunteerism and outreach before it became *the* thing to do.

**COMMITMENT PARTNERS:**

- Hispanic Employee Resource Group
- JSC External Relations Office
- ISS Program Science Office
- JSC Information Resources Directorate
- Clear Creek Independent School District
- Univision Houston local media
- Agencia Espacial Mexicana (The Mexican Space Agency)
- AEXA Aerospace

# ‘Leaf’ it to NASA to grow lettuce on space station

**ON AUG. 10,** really fresh food grown in the microgravity environment of space was officially on the menu for the first time for astronauts aboard the International Space Station. The Expedition 44 crew, including NASA’s one-year astronaut Scott Kelly, sampled the fruits—or rather, the veggies—of their labor after harvesting a crop of red romaine lettuce from the Veggie plant growth system aboard the orbiting laboratory.

The astronauts cleaned the leafy greens with citric acid-based, food-safe sanitizing wipes before consuming them. Half of the bounty has been packaged and frozen until it can be returned to Earth for scientific analysis.

NASA’s plant experiment, called Veg-01, is being used to study the in-orbit function and performance of the plant growth facility and its rooting “pillows,” which contain the seeds.

NASA/PHOTO

**NASA astronauts Scott Kelly (right) and Kjell Lindgren get their taste buds ready for the first taste of food that has been grown, harvested and eaten in space, a critical step on the journey to Mars.**

NASA/PHOTO

**NASA plans to grow food on future spacecraft and on other planets as a food supplement for astronauts. Fresh food, such as vegetables, provide essential vitamins and nutrients that will help enable sustainable deep space pioneering.**

NASA/PHOTO

## Halftime in space

**HIS MORNINGS START** the same as millions of others around the planet: The alarm goes off, he climbs out of bed, gets morning coffee … But as he glances out the window before starting his short commute to work, Scott Kelly's view is one that few people have had the privilege of enjoying first hand.

On Sept. 15, Kelly, the commander of the International Space Station, passed the halfway mark of a one-year mission on the orbiting laboratory. The one-year mission began in March and is enabling the most detailed study of long-duration human spaceflight to date.

The average International Space Station expedition lasts four to six months. Kelly and Roscosmos (Russian Federal Space Agency) cosmonaut Mikhail Kornienko are spending a full year on the station, not only to advance knowledge of our world, but also to conduct science on themselves—measuring changes in motor skills, eyesight, fluid shifts in their bodies and basic neurology. These investigations on the world’s only microgravity lab are crucial to preparing humans for exploration of deep space, including our journey to Mars.

# **It's complicated:** New Pluto images from NASA's New Horizons offer many surprises

**NEW CLOSE-UP IMAGES OF PLUTO** from NASA's New Horizons spacecraft reveal a bewildering variety of surface features that have scientists reeling because of their range and complexity.

"Pluto is showing us a diversity of landforms and complexity of processes that rival anything we've seen in the solar system," said New Horizons Principal Investigator Alan Stern of the Southwest Research Institute in Boulder, Colorado. "If an artist had painted this Pluto before our flyby, I probably would have called it over the top—but that's what is actually there."

New Horizons began its yearlong download of new images and other data over Labor Day weekend. Images downlinked have more than doubled the amount of Pluto's surface seen at resolutions as good as 400 meters (440 yards) per pixel. They reveal new features as diverse as possible dunes, nitrogen ice flows that apparently oozed out of mountainous regions onto plains and even networks of valleys that may have been carved by material flowing over Pluto's surface. They also show large regions that display chaotically jumbled mountains reminiscent of disrupted terrains on Jupiter's icy moon Europa.

"The surface of Pluto is every bit as complex as that of Mars," said Jeff Moore, leader of the New Horizons Geology, Geophysics and Imaging (GGI) team at NASA's Ames Research Center in Moffett Field, California. "The randomly jumbled mountains might be huge blocks of hard water ice floating within a vast, denser, softer deposit of frozen nitrogen within the region informally named Sputnik Planum."

New images also show the most heavily cratered—and thus oldest—terrain yet seen by New Horizons on Pluto next to the youngest, most crater-free icy plains. There might even be a field of dark, windblown dunes, among other possibilities.

"Seeing dunes on Pluto—if that is what they are—would be completely wild, because Pluto's atmosphere today is so thin," said William B. McKinnon, a GGI deputy lead from Washington University, St. Louis. "Either Pluto had a thicker atmosphere in the past, or some process we haven't figured out is at work. It's a head-scratcher."

The New Horizons spacecraft is now more than 3 billion miles (about 5 billion kilometers) from Earth, and more than 43 million miles (69 million kilometers) beyond Pluto. The spacecraft is healthy and all systems are operating normally.

Follow the mission at http://www.nasa.gov/newhorizons and http://pluto.jhuapl.edu.

NASA/JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY/SOUTHWEST RESEARCH INSTITUTE

**This synthetic perspective view of Pluto, based on the latest high-resolution images to be downlinked from NASA's New Horizons spacecraft, shows what you would see if you were approximately 1,100 miles (1,800 kilometers) above Pluto's equatorial area, looking northeast over the dark, cratered, informally named Cthulhu Regio toward the bright, smooth, expanse of icy plains informally called Sputnik Planum.**

NASA/JOHNS HOPKINS UNIVERSITY APPLIED PHYSICS LABORATORY/SOUTHWEST RESEARCH INSTITUTE

**Pluto wearing its "heart" on its surface. The image is dominated by the informally named icy plain Sputnik Planum, the smooth, bright region across the center. This image also features a tremendous variety of other landscapes surrounding Sputnik.**

# Spotlight: **Delene Sedillo**

## Associate Director, Office of Procurement

**Q: Coolest part of your job at Johnson Space Center?**
**A:** Getting to see the fruition of all our hard work. Our Procurement team partners very closely with the organizations and programs we support to enable NASA's mission. Approximately 85 percent of NASA's budget is spent via some form of contracting; for JSC, we spent $3.9 billion (B) in Fiscal Year 2014. Our organization gets to enable NASA's mission in many ways, and our procurement team executes some of the agency's largest contracts with significant impact to continued spaceflight and exploration goals. The International Space Station Sustaining Engineering Contract, the agency's largest valued at $17.7B, and the Orion Multi-Purpose Crew Vehicle contract, valued at $11.4B, are two examples of contracts that we manage here at JSC to enable NASA's mission.

**Q: You are to be recognized by the *Women of Color* magazine in October for Managerial Leadership in Government. What is your best advice for someone taking on a leadership role?**
**A:** Whether taking on a leadership role for the first time or moving to a new leadership role, it's important to get to know the people and the environment. Do your homework. If you're in a support organization like we are in Procurement, it's important to understand the customer's mission and objectives and how well the organization is meeting or exceeding expectations. Getting the perspectives of the employees on what they think is going well for the organization is a great starting point and starts the transition off on a positive note.

**Q: What qualities do you think are most important in a leader?**
**A:** Integrity, courage, resilience and the ability to communicate.

**Q: What would people be surprised to know about you?**
**A:** I'm a big soccer fan (GO DYNAMO!), and I've been to every World Cup since 1994 (United States, France, South Korea, Germany, South Africa and Brazil).

**Q: If you could trade places with any other person for a week, famous or not famous, living or dead, real or fictional, who would it be?**
**A:** LPGA (Ladies Professional Golf Association) golfer Nancy Lopez. She grew up in New Mexico like I did and was winning big on the LPGA tour in the late '70s. There was a small group of girls that I played golf with at that time, and we would always try to mimic her swing. If I traded places with her for a week, the one request that I'd make is to be able to steal her chipping style!

**Q: What is your favorite indulgence?**
**A:** Hanging out with my hubby and dogs, Chili and Rio.

**Q: What things would we find on your bucket list?**
**A:** Watching an SLS (Space Launch System) launch with Orion, going with my hubby to as many of the next World Cups as we can and playing in the Houston Ladies Senior Golf Amateur Championship—and winning.

**Q: What seemingly "little things" bring you joy?**
**A:** Sunrises, sunsets and watching ocean waves crash.

**Q: Describe yourself in three words.**
**A:** Adventurous, curious and fun.

**Q: When did you first become interested in space, and why?**
**A:** I grew up in a small town in New Mexico watching "Star Trek" and "Lost in Space," along with going on road trips with my parents to the Very Large Array, which was about an hour outside of my hometown. I've always been interested in space, but not until I came to JSC as a co-op did I realize that I could be part of the mission to explore space. I was pursuing a finance degree and wanted to be a stockbroker, but my path was set after my first co-op tour. I felt like I had found a place where I could make a difference, and I've been here ever since.

NASA/PHOTO ROBERT MARKOWITZ

**Q: What is your favorite memory at JSC or of the space program?**
**A:** I worked with the X-38/Crew Return Vehicle team and got to go to Edwards for the B-52 drop test, which was really cool. As it was dropping I was holding my breath, waiting for the parafoil to deploy (which it did, very successfully)! This is my favorite memory because of the people that I got to work with and actually see the results of the hard work that we'd all put in and to be part of the team that helped make it happen.

**Q: What excites you most about NASA's #JourneyToMars?**
**A:** I think exploring is one of the coolest things we do as humans, and I'm honored and excited to be part of the team that will take humans to Mars.

# Snapshots



## Soaring to new heights

**MANY SAID IT WAS THE** best Bring Our Children to Work Day yet. On Aug. 13, more than 800 kids—or shall we say future space professionals—joined Johnson Space Center team members at Space Center Houston to learn, engage and explore.

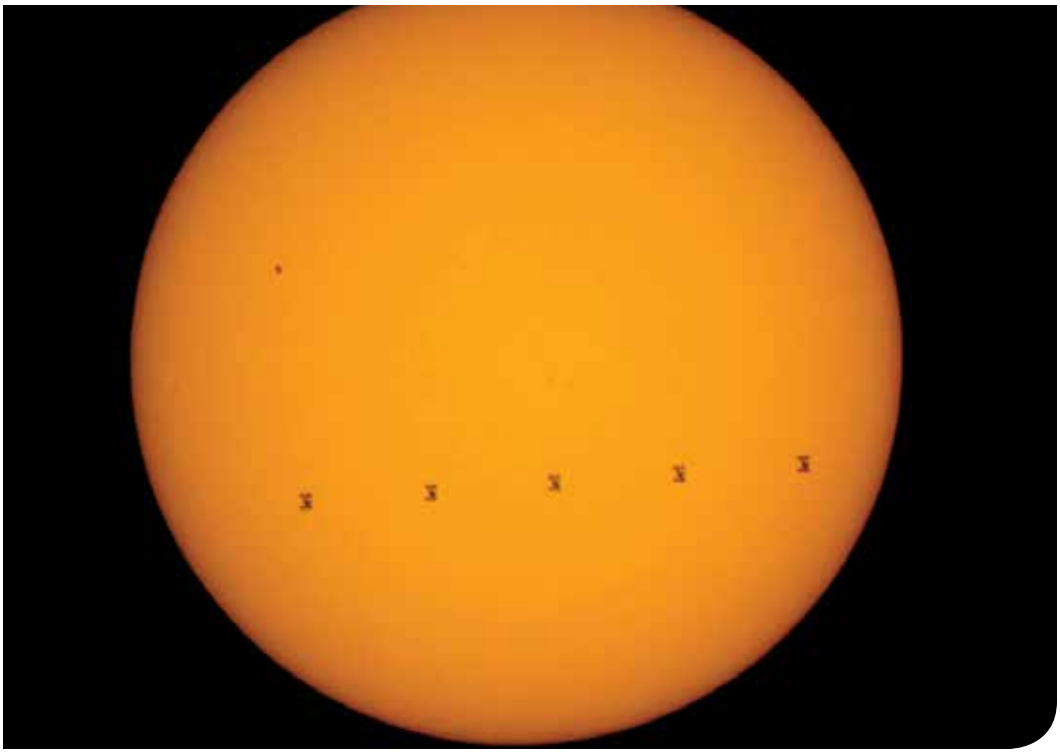
Some highlights included a rousing welcome by JSC's Jamian Lattin-Sims, an intriguing talk about the wonders of exploration and our International Space Station by spaceflight veteran Mike Fincke and exhibits representing a plethora of human exploration activities and programs. New for the year—a paper-plane fly-by and competition hosted by a group of paper-plane experts that came all the way from Japan—got kids pumped for aeronautics through the crafting of their own elite (albeit paper) flying machines. Japanese Aerospace Exploration Agency astronaut Koichi Wakata volunteered his time, too, interacting with eager participants and posing for pictures.

NASA/JAMES BLAIR AND ALLISON BILLS

NASA/BILL INGALLS

## Don't mind us … we're just space stationing

**THIS COMPOSITE IMAGE** made from five frames shows the International Space Station, with a crew of nine onboard, in silhouette as it transits the sun at roughly 5 miles per second on Sept. 6 from Shenandoah National Park, Front Royal, Virginia. Onboard are: NASA astronauts Scott Kelly and Kjell Lindgren; Russian cosmonauts Gennady Padalka, Mikhail Kornienko, Oleg Kononenko, Sergey Volkov; Japanese astronaut Kimiya Yui; Danish astronaut Andreas Mogensen; and Kazakhstan cosmonaut Aidyn Aimbetov.



NASA/BILL INGALLS

Roundup

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# Curiosity's latest selfie on Mars

**NASA'S CURIOSITY MARS ROVER** never seems to tire of navel-gazing—not that we're complaining. This low-angle self-portrait shows the vehicle above the "Buckskin" rock target, where the mission collected its seventh drilled sample. The site is in the "Marias Pass" area of lower Mount Sharp.

The scene combines dozens of images taken by Curiosity's Mars Hand Lens Imager on Aug. 5 during the 1,065th Martian day, or sol, of the rover's work on Mars. For scale, the rover's wheels are 20 inches in diameter and about 16 inches wide.

Curiosity drilled the hole at Buckskin during Sol 1060 (July 30). Two patches of pale, powdered rock material pulled from Buckskin are visible in this scene, in front of the rover. The patch closer to the rover is where the sample-handling mechanism on Curiosity's robotic arm dumped collected material that did not pass through a sieve in the mechanism. Sieved sample material was delivered to laboratory instruments inside the rover. The patch farther in front of the rover, roughly triangular in shape, shows where fresh tailings spread downhill from the drilling process. The drilled hole, 0.63 inch in diameter, is at the upper point of the tailings.

The rover is facing northeast, looking out over the plains from the crest of a 20-foot hill that it climbed to reach the Marias Pass area. The upper levels of Mount Sharp are visible behind the rover, while Gale Crater's northern rim dominates the horizon on the left and right of the mosaic.

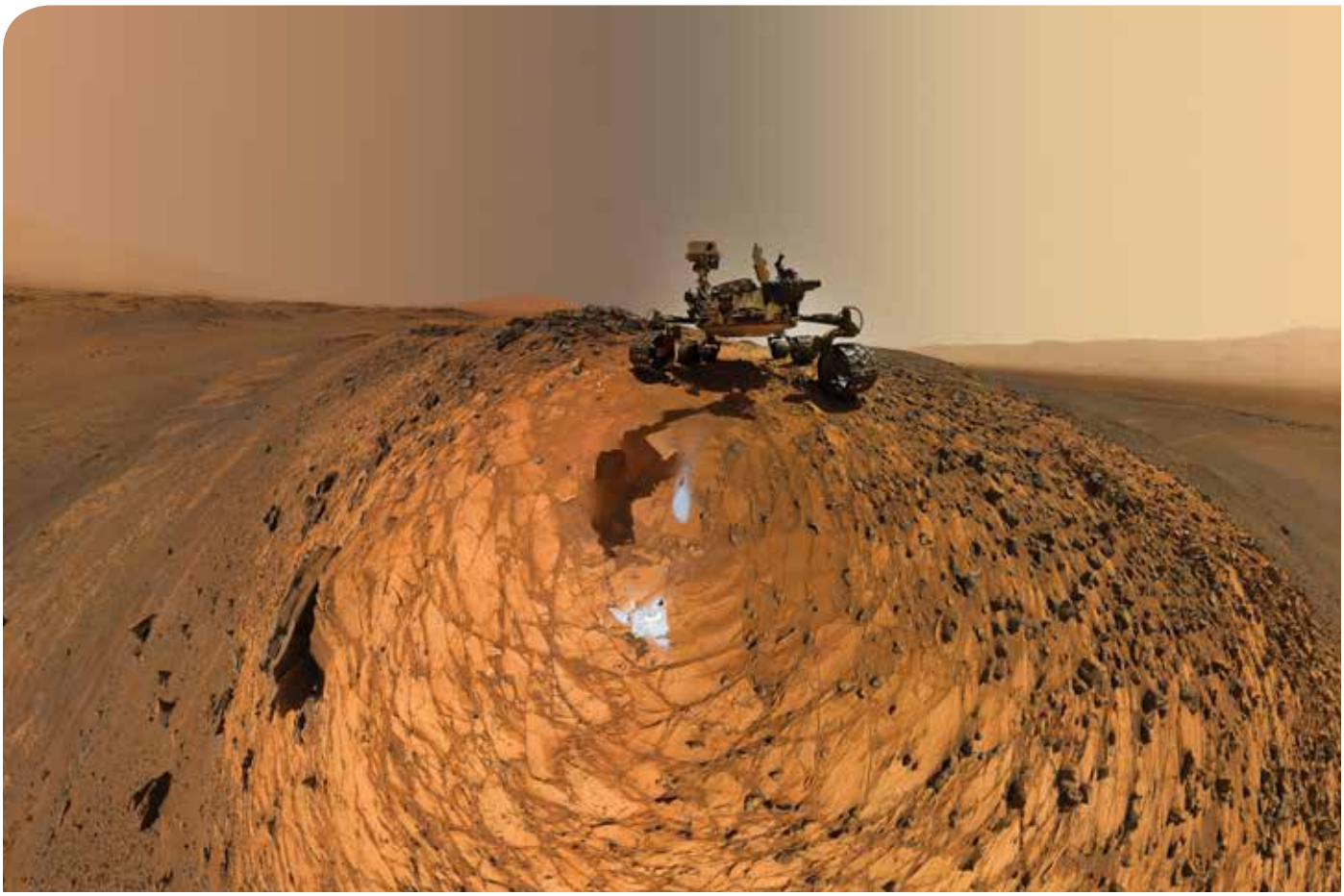

IMAGE CREDIT: NASA/JPL-CALTECH/MSSS